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Riter-Conley Manufacturing Company

STEEL CONSTRUCTION

Pittsburgh

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THE UNITED GAS IMPROVEMENT COMPANY,

PHILADELPHIA.

BUILDERS OF

THE STANDARD DOUBLE SUPERHEATER

LOWE WATER GAS APPARATUS.

ACCURATE MEASUREMENT

OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { **PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.**

PRODUCING { **UNIFORM RESULTS. HIGHEST EFFICIENCIES.**

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VOL. CII., No. 6. NEW YORK, FEBRUARY 8, 1915. WHOLE No. 2,070.

PRESIDENT'S ADDRESS, WISCONSIN GAS ASSOCIATION.

MR. JAMES H. WALKER.

Gentlemen of the Wisconsin Gas Association:—We are assembled to-day to inaugurate the fourteenth annual convention of our Association, and although it is at an earlier date than set by our constitution and with the added feature of a joint meeting with our friends of the Wisconsin Electrical Association, I sincerely trust that the convention will close leaving the impression that it was well worth attending.

The papers submitted, of especial interest to the gas fraternity, will be supplemented by papers on carefully selected subjects prepared by capable and earnest men intended to interest members of both associations, and there is no doubt but that you will be well repaid for the time and effort devoted to the meetings of both associations.

The question of future joint meetings with the Wisconsin Electrical Association will undoubtedly be laid before you for action thereon at some future date. I charge you to be prepared for such action by carefully weighing the advantages and disadvantages of such a combination by close attention to the conditions confronting you at this meeting, that you may be able to vote conscientiously and without prejudice when called upon to exercise such rights.

At our last annual convention the subject of the consolidation of the American Gas Institute and the National Commercial Gas Association, and the absorbing of all State Associations as sectional parts of the combination, aroused healthy interest and animated discussion, and the result was a vote by us favorable to such a combination, assuming that all interests would be provided for in an equitable manner. While not desiring to personally influence this convention, it seems to me that an affiliation of our State association with such a combination as an association (not as individual members) would be productive of great good to a larger number of men engaged in the gas business, not only as executive officers, but to all men whose conscientious efforts make them an equal factor in maintaining the high efficiency of the companies with which they are connected.

The educational benefits which the parent association could extend to the fraternity at large would be of greater scope than is possible with State associations, owing to limited membership and area, and these facilities under wise administration would be of incalculable value to the older as well as the younger and coming generation of gas managers, on whom the gas companies of the country must depend for their future prosperity. The educational facilities provided by the national associations in both engineering and commercial lines have proved beneficial to the business to a greater degree than I believe is generally realized, and should be encouraged and extended.

Those interests of gas companies which involve State legislative action must be taken care of by State associations, and only by associated co-operation can the relations between State government, public utilities and the public be properly conserved and adjusted for the benefit of all concerned—making State associations a necessity.

The social relations brought about by our annual conventions constitute a most valuable feature of our work and tend to more thoroughly harmonize our actions in a business way, and strengthen the bonds of friendship to a degree that makes co-operation in our work a positive factor.

To our Associate members too much praise can not be given for their hearty co-operation and support, and our success as an association has been largely due to their untiring efforts in our behalf, by their cheerful presence at the meetings and their unfaltering loyalty.

The association plan outlined in Mr. Walker's Address and which has the endorsement of the Wisconsin Gas Association, recommends the consolidation of the American Gas Institute and the National Commercial Gas Association, affiliation of the State associations with the new National Society, and joint meetings of representatives of gas and electric utility representatives in State conventions.

REPORT OF N. C. G. A. COMMITTEE ON INDOOR LIGHTING.[1]

MR. SIDNEY MASON, Chairman.

It is now generally conceded that gas lighting is a most important branch of the gas industry, and most gas men agree that renewed activity, a more aggressive selling policy, better gas service and continued improvement in lighting appliances are necessary to further the progress of gas illumination. Gas lighting gives the industry its chief publicity, and when at its best it far excels any other form of illumination. Eminent physicists have shown that, from the standpoint of quality, it is the most satisfactory illuminant. Commercially, it is the most efficient—for efficiency to the user must always be considered from the standpoint of the illuminating service delivered for a given cost. Notwithstanding the high cost handicap under which electric light has labored, it has achieved remarkable success by means of clever and persistant publicity and sales energy. While gas lighting is steadily growing, its growth could be greatly accelerated by employing new ideas and new selling methods. It is desirable that every employee of a gas company be a real booster for gas illumination, and he should be remunerated for any new business, whether he be in the sales department or some other department.

As before stated, gas lighting is steadily growing, shown by the continual increase in incandescent mantle output. The following figures will be interesting in this connection:

Estimated number of mantles sold per year.....	60,000,000
Estimated number used for natural gas, gasoline, etc..	10,000,000
Estimated number of mantles used on artificial gas...	50,000,000

These would account for a gas consumption of at least 75,000,000,000 cubic feet per year through incandescent gas lamps, and while it is difficult to obtain any definite data on the amount of gas put out for incandescent gas lighting, the above figures indicate the importance of incandescent gas lighting to the industry. The U. S. Geological Survey report states that 100,000,000,000 cubic feet of gas was used in the year 1912 for illumination, but it cannot be assumed that nearly all of it is by means of incandescent mantle burners.

It is not possible to make any reliable estimate of the comparative extent of use of gas and electric lighting, but it is safe to say that in the cities of Boston, New York, Philadelphia, Baltimore and Washington conditions are approximately the same, and it must also be remembered that these cities and nearby towns represent nearly 20% of the total population of the country. In one of the larger cities mentioned, there are less than 60,000 electric consumers and more than 400,000 gas consumers, and it is obvious that it would be impossible to reverse these conditions within a generation. The statement is made that in the west and middle west the above conditions do not exist and that many new houses are wired for electric light only. This is a purely local condition that can be remedied by aggressive promotion and sale of combination fixtures. One large gas company supplying a population of 100,000 succeeds in installing combination fixtures in 85% of all the houses erected, and investigation has shown that over 50% of these houses use gas exclusively for illumination, and more than one-half of the remainder use both gas and electric lighting.

Improvements in Gas Lighting Appliances.—The past year's efforts in research work by manufacturers enable your committee to announce a decided improvement in the efficiency of incandescent gas burners, exceeding in some units 50%. The improvement may be applied to burners of from 100 to 1,000 candle power, and will operate satisfactorily over a wide range of variation in gas pressure and gas quality, and no enclosing glassware is necessary. With the smaller size, soft or unhardened mantles may be used. (Fig. 1).

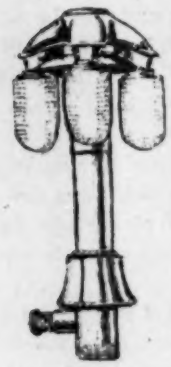

Fig. 1.

Another interesting development is the horizontal burner, designed for semi-indirect lighting fixtures, making possible a more efficient and very much more artistic fixture. A number of manufacturers have applied this type of construction to a variety of designs of gas and combination fixtures. (Figs. 2, 3 and 21).

Most of the semi-indirect fixtures on the market are equipped with the single chain pull, although one manufacturer

1. The report is slightly abridged and taken from uncorrected proof sheets.—Ed.

Fig. 2.

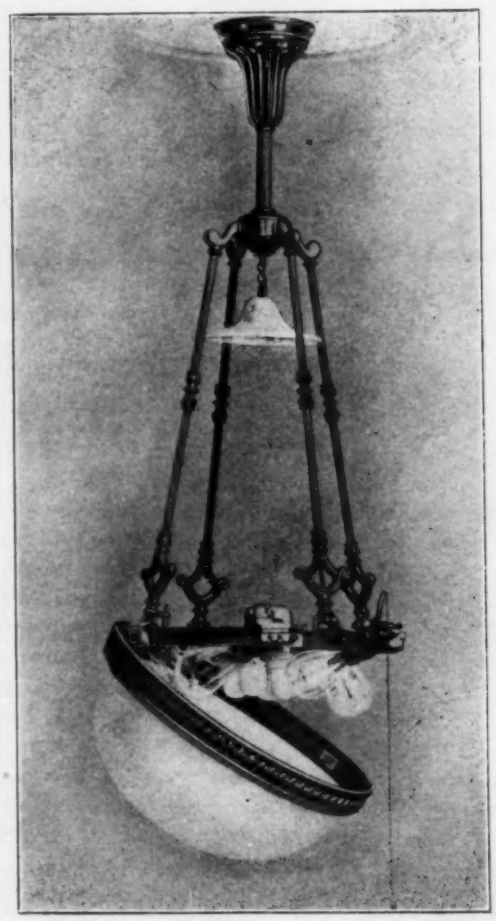

Fig. 3.

puts out the two-chain exclusively. Another manufacturer uses an inclined mica canopy above the mantles to divert the products of combustion out between the arms of the fixture at a low level which protects both ceiling and fixture. A mica canopy is also employed below the mantles to protect the expensive bowls from the bare flame in case a mantle breaks.

Another manufacturer has a glass or metal bell suspended in the upper part of the fixture to divert the heat.

The use of semi-indirect fixtures on a large scale will no doubt depend upon the selling method employed. Perhaps some of the methods used for putting out gas arcs and other commercial units should be applied to selling of these fixtures in residences. That is, a fixture may be installed for a nominal fee, and a monthly charge including maintenance over a period of a year or two. Other articles of merchandise are very successfully marketed in residences in this way, talking machines, sewing machines, etc. Attractive selling schemes must be employed in many cases to sell articles of this character, especially to consumers who rent their homes.

Several single chain pull by-passes have been brought out the past year for use in connection with residential burners.

Fused silica cylinders for large and small lamps have been placed on the market to take the place of glass cylinders. The material (quartz) from which they are made has been greatly improved, and they present a better appearance than those first manufactured. They will not crack under the influence of the heat or sudden heat changes.

Artistic husks have been designed to cover the by-pass and the burner of small size upright mantle units, made to match the socket covers used in electric lighting.

An improved flexible drop light tubing will not give off an offensive odor even after being in use for a long period.

Large flat enameled ceiling shields have been designed for use in connection with various types of indoor units, particularly for rooms with low ceilings or where it is especially desirable to hang the units close to the ceiling.

Ornamental large single mantle lamps for commercial lighting have been brought out in durable metal finishes, to take the place of the enameled lamps which are not always acceptable in the better class retail establishments. (Fig. 4.) An inclined metal baffle in the upper part of shell diverts the products to one side of lamp at a low level. A highly efficient residential burner of ornamental design uses a mantle smaller and more efficient than those previously marketed. (Fig. 5.)

Fig. 4.

Fig. 5.

Developments in Distance Control.—Several new devices for the distance control of gas have been brought out. In one, a diaphragm controlled valve is operated by gas pressure conducted from the point of control to the valve through a small pressure tube. The admission of gas to this tube closes the valve, shuts off the gas supply to the tube and opens it to the atmosphere. Thus releasing the pressure on a diaphragm controlling the valve results in the valve opening. This valve may be attached to any outlet, it being necessary simply to run the extra gas supply tube to the point of control and there make a gas connection with the pipes in the building. There are two distinct advantages of this type of valve. First, it may be attached to any outlet in the building without disturbing other lamps on the same line, and second, there is no change in the length of pilot flame with the opening or closing of the valve.

A new electric cock has been developed which requires very little energy for its operation, a single dry cell being sufficient. The valve is of a circular knife-edge type with an extremely short stroke, operated by a heavy cylindrical armature spaced closely before the poles of a powerful iron-jacketed magnet.

A mercury valve containing two bells dipping in a pot of mercury, which rise and open the valve on service pressure and descend and close the gas way to the lamp on a decreased pressure, promises to be a very popular form of valve for distance control. The pilot flame in this increases in length when the valve is opened.

Another form of pressure control valve which has been developed opens on the service pressure and closes on the lessened pressure, but without the use of mercury. In this case an automatic flashing pilot is employed and the pilot flame burns at practically uniform length.

The following photographs of installations shows what has been accomplished during the past year in improving gas lighting from the standpoint of proper selection and arrangement of lamps and in stimulating the desire of the customer for fixtures of more attractive and artistic appearance.

Fig. 6.

Fig. 6 is a machine shop lighted by large single mantle units with a new type of reflector, in which the upper portion is perforated to permit illumination of the upper part of the room sufficiently to enable the workman to inspect belts, bearings, etc., and to relieve the depressing effect of unlighted areas overhead. This system utilizes the light more advantageously than is possible with units having no reflectors, and illuminates ceiling and sidewalls, which is the principal reason for installing units without reflectors.

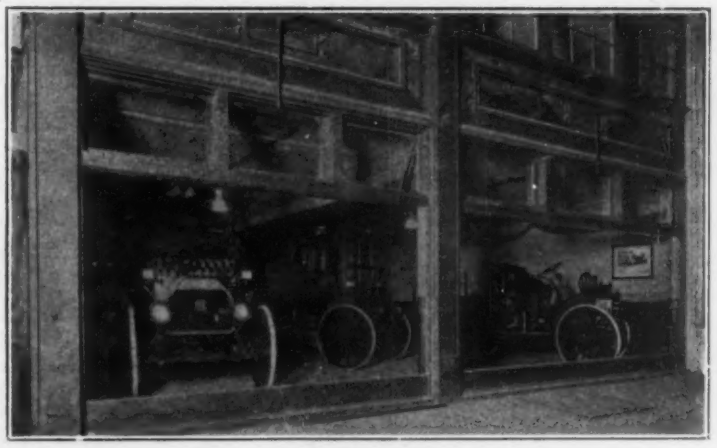

Fig. 7.

Fig. 7 shows a window lighted by single mantle units, controlled by a chain run outside through the upper part of the sash.

Fig. 8.

Fig. 8 is a bowling alley lighted by large single mantle units with metal angle reflectors. This type of lighting is very satisfactory where the walls and ceilings are light and the lamps may be suspended at a good height. Its particular advantages is low cost and maintenance.

Fig. 9.

Fig. 9 shows an installation of ornamental large single mantle unit in a furniture store.

Fig. 10.

Fig. 10 is an installation in which each single mantle unit replaced four tungsten lamps of 60 watts each.

Fig. 11 is an excellent example of " How not to do it." One large single mantle unit is installed above each chair, but a single small mantle would have been equally satisfactory from the standpoint of the barber and far less annoying to the victim. Opaline ball globes should always be used in installations of this character, as the eyes of the man in the chair cannot be adequately protected in any other way.

Fig. 12 shows a bowling alley lighted by large single mantle units with focusing reflector; and a small single mantle unit over each

Fig. 11.

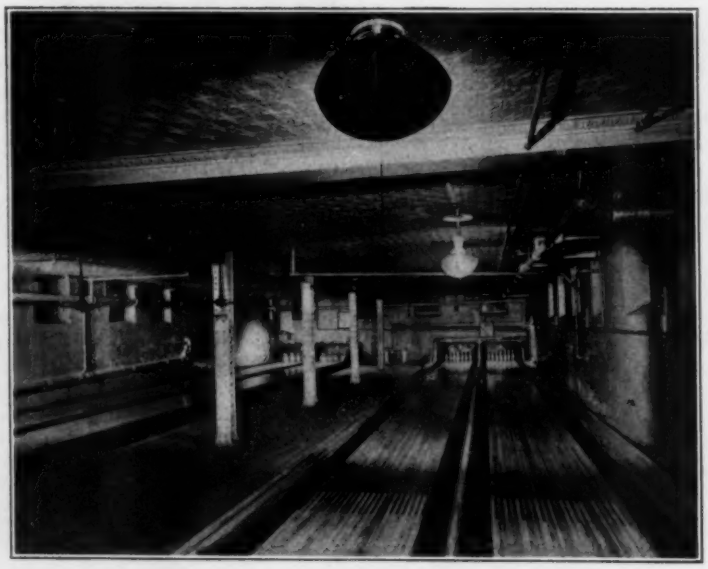

Fig. 12.

pin-board. Only two large units are required for each pair of alleys. This makes a very efficient installation and is satisfactory if the ceiling is light.

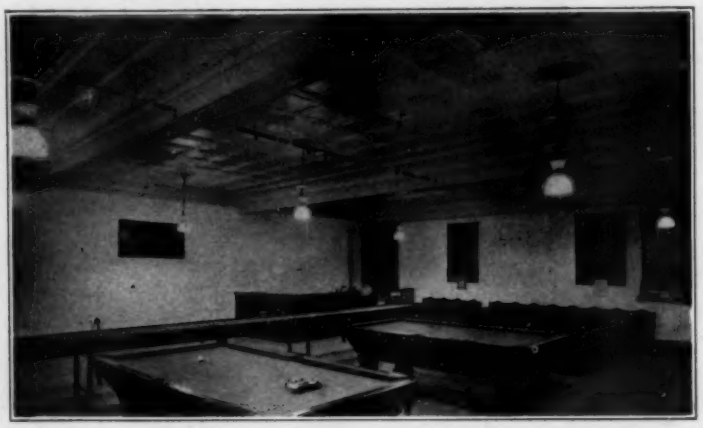

Fig. 13.

Fig 13 shows the lighting of a billiard hall by large single mantle units. The general illumination would have been more effective had the lamps been higher. This is a very satisfactory method where the tables are close together, and if sufficient volume of illumination is provided.

Fig. 14 shows a club-house hall lighted by a semi-indirect fixture with an inner reflector directing most of the light toward the ceiling, the outer bowl of art glass receiving only enough light to be pleasantly illuminated. This is a novelty that may be applied to residence lighting to good advantage.

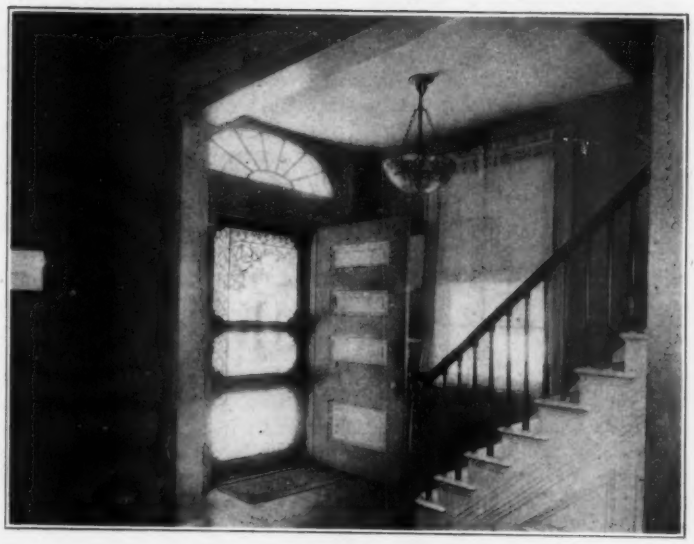

Fig. 14.

Fig. 15.

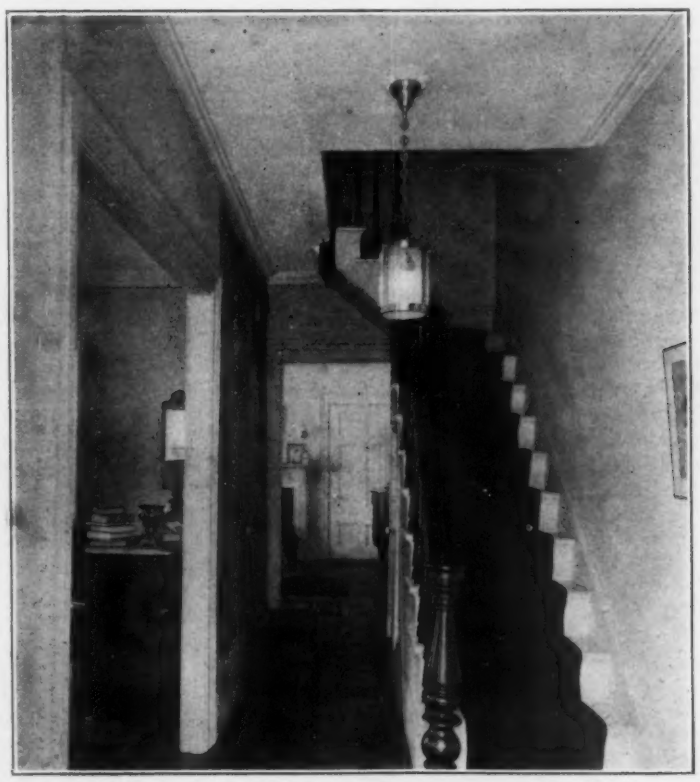

Fig. 16.

Fig. 15 shows a semi-indirect gas installation that replaced direct electric lighting in a dry goods store. This type is becoming very popular in mercantile establishments, as shoppers appreciate the more comfortable illumination.

Fig. 16 shows the hall of an old residence in which the occupant, who happened to be an architect, remodeled the lighting installation at slight expense, indicating what may be done by combining good taste with a very small expenditure of money. It is lighted by one inverted lamp consuming 2 cubic feet of gas per hour in a cylindrical lantern of etched glass.

Fig. 17.

Fig. 17 shows the lighting of a dresser in the bedroom of this house. With the exception of the hall, the center ceiling fixtures were all removed, the entire lighting being by bracket lights and portables. In order to protect the eyes the cylinders are etched.

Fig. 18.

Fig. 18 shows a large installation of gas arc lamps.

Fig. 19 shows clusters of gas arcs on an amusement pier. The fixtures are of an expensive type and the installation is more impressive than the same number of single arc lamps.

Fig. 20 is part of a large installation obtained by the willingness of the gas company to design and furnish a special fixture. This customer had obtained rather unsatisfactory results from electricity, but would not consider arc lamps or other commercial units because he wished a distinctive installation rather than the sort employed by other merchants in the same street. This fixture was manufactured in the shops of the gas company; which has since retained the services of a designer and will, whenever desired, design and obtain special fixtures for a customer. They are thus able to

obtain a class of business they had never before been able to interest, and have no difficulty in selling these special fixtures at a satisfactory price. This in a city of 100,000 inhabitants.

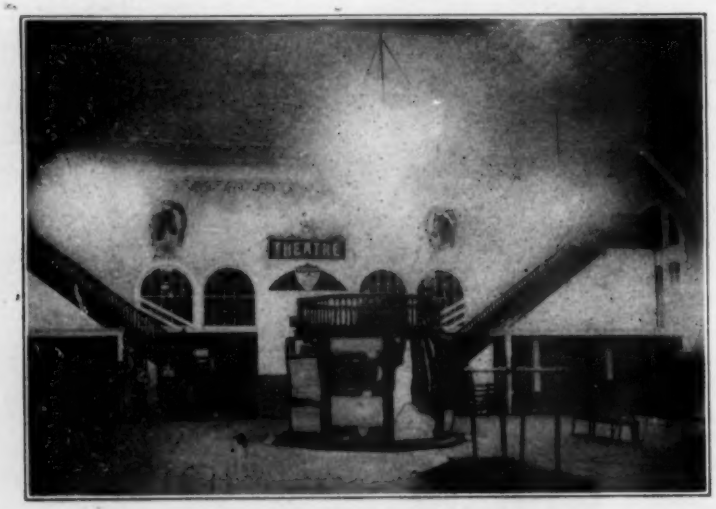

Fig. 19.

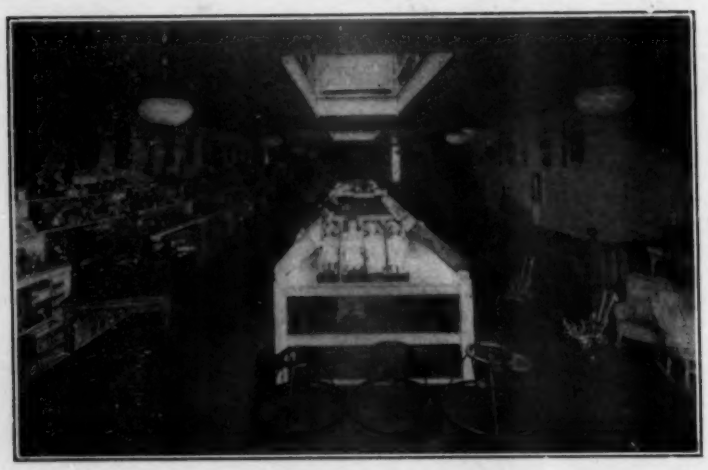

Fig. 20.

Fig. 21.

Fig. 21 illustrates the use of semi-indirect gas fixtures in a residence, which is destined to become the most popular method of lighting. There are many reasons why the semi-indirect method is superior to the indirect. With either, a light ceiling is desirable. In this installation, however, the heavy dark beams of the ceiling interfere more or less with the re-directed light, but notwithstanding this it is possible to get enough direct light through the glass if sufficient mantles are used. Semi-indirect lighting has met with such marked success, particularly in electric lighting, that many of the new hotels and residences employ it exclusively, and it behooves gas men to take advantage of this popular demand, especially when it can be shown that gas gives a more uniform lighting of the glass bowl and a better color value, without excessive cost.

Sales Promotion.—Gas companies desiring to extend the sale of gas for illumination or other purposes must engage in the sale of appliances, and the organization of the Commercial Department should be considered of first importance. No other department of management needs more thorough and systematic direction than the sales staff. To assist this work your Association is conducting an educational course which is of definite value in assisting salesmen to meet customers' requirements and otherwise fit themselves for commercial activity. The management of gas companies should put forth special efforts to increase interest in this course.

Where a salesman shows interest in his work and an inclination to educate himself for more effective accomplishment, his remuneration must be satisfactory to him. A disposition to rate such a man's labor as a commodity to be purchased at the lowest market price cannot fail to discourage an ambitious and progressive man who desires to be raised according to the results he secures.

Two features of sales promotion for stimulating gas output which commend themselves to your committee are—sales campaigns and maintenance service.

Selling Campaigns.—Information from gas companies on present and heretofore conducting selling campaigns pronounce the plan as producing very gratifying results. Those companies whose results have not been entirely satisfactory find them traceable to details having nothing to do with the general principles of this manner of selling. Companies who annually conduct campaigns report highly successful results both in volumes of sales and in reducing expense of conducting campaigns, proving that where details are properly supervised and expenses properly classified a selling campaign is profitable in itself, apart from the increased gas output secured.

It is remarkable how greatly the buying activity of the public may be increased by aggressive and systematic selling methods, and companies who actively pursue this policy are obtaining most gratifying results, notwithstanding the very general report of financial and industrial depression.

Maintenance Service.—The service of incandescent gas lamps will be found to vary, depending on quality and pressure of gas, type of lamp and equipment, care and attention. Each is as important as the other, and all are essential for good gas lighting. It is to be noted that general improvement in gas manufacture is resulting in more uniform quality and pressure, and that manufacturers of lighting appliances are designing and constructing units capable of excellent performance under normal gas conditions, so that with proper care and attention gas lighting should be in every sense not only satisfactory, but preferred.

Gas companies replying to communications issued by your committee, while stating that maintenance of lamps is of first importance, offer no new ideas or methods for conducting a maintenance service. One company reported that it had within the past year introduced a system of bonuses and penalties which had accomplished more careful and conscientious attention on the part of the maintenance men, enabling them to increase their compensation and at the same time reducing the cost of the service to the company. Your committee wish to emphasize the far-reaching importance of maintenance service, which, to be successful, should accomplish; first, improved lighting service to the consumer; second, increased use of gas for illumination; third, pay its own way, either in direct or indirect profit.

Miscellaneous Considerations.—The opinion is very generally expressed that gas companies must make greater effort to have all new buildings piped for gas illumination, and that architects and plumbers, as well as the public, should be fully informed on the advantages, conveniences and economy of modern gas illumination. Such work to be effective must be continuous, and those companies who are making an aggressive campaign to this end report gratifying results. A plan to secure the co-operation of the local plumbers should prove as helpful as a similar plan adopted by the electrical interests. Remarkable success has been attained by a close working agreement between electrical contractors and the central station in the following way: Any wiring contract secured by the contractor will be taken over by the central station and the charge spread over a period of as much as two years, payment to be made by the consumer with his monthly current bill.

A number of gas companies report that, in order to obtain the lighting business, they have adopted the policy of handling and aggressively pushing the sale of combination fixtures, which insures an installation where gas may be used. The importance of this class of work has warranted detailing a special salesman to follow up new building operations, and the fixturing of the building with combination fixtures make it possible for the lamp salesman to secure installations of modern incandescent lights in the frequently used parts. By this means gas companies have been successful in securing the the greater part of the lighting service. Companies who feature the sale of combination fixtures express the opinion that failure to undertake this work is responsible in most cases for a substantial loss in gas lighting business.

Among combination companies there is an increasing tendency to regard the sale of gas for lighting as profitable and desirable where it was formerly thought that electric lighting offered greater profits to the central station company. Since the introduction of the tungsten lamp and the more careful analysis of service costs, it appears that residence lighting business is productive of very small profits, and it is acknowledged by a number of large electric companies that this class of business is unprofitable on account of the high fixed charges.

What is Being Done by Manufacturers of Appliances to Encourage the Use of Gas.

[Read before New Jersey State Gas Association by STANLEY GRADY.]

The subject selected for me by your Secretary is a rather broad one and in the opinion of the writer, could have been more thoroughly treated by a commercial gas man than by a manufacturer's representative, by reason of the fact that gas companies receive the direct benefit and are in a position to judge just what revenue and benefits are derived from the manufacturer's efforts to popularize the use of gas.

Let us first consider what could be done by manufacturers under the general heads of;

1. *Manufacturing.*
2. *Advertising;* with sub-division of Selling and Educational work.

Primarily and most important of all in the writer's opinion is the manufacturing of high grade, efficient appliances, which by reason of their efficiency, economy and adaptibility to the needs of the consumer, not only find ready sale, but stay sold and invite constant use. I believe a large proportion of our manufacturers of gas appliances have this idea in mind constantly, but are handicapped to a certain extent in making better appliances by realizing that when the appliances exceeds a certain price it will be almost impossible to secure the volume of business possible on the lower priced appliances. There is no doubt, that with few exceptions the manufacturers could build better appliances that would give better and longer service, if it were possible to get the assurance of that volume of business which is necessary to maintain a fair percentage of overhead expense.

Under the head of Advertising should be included the selling of the appliance, and also the educational work necessary to attain the goal both manufacturers and gas men are striving for, namely, that of making gas the Universal Fuel.

Manufacturers have, and are at present, conducting large national advertising campaigns, not only advertising the particular articles offered for sale, but also featuring the fact that it burns gas. Direct advertising by means of folders, circulars, etc., have and are being used to a large extent through mailing lists, furnished either by the gas companies, or by the manufacturers' representatives working from a branch office and display room established and maintained by the manufacturers. Literature of all descriptions is furnished the gas companies for distribution by all manufacturers, representing a large outlay of money. And, I regret to say in many instances it is never used, and eventually finds its way to the scrap heap, oftentimes without even the formality of removing it from the original package.

The most valuable factor we have in the educational line is the National Commercial Gas Association. By co-operation the manufacturer feels he has helped make that Association possible, and particularly by supporting the exhibitions given each year in connection with the annual convention. These are an education in themselves, if the gas men attending had the time and inclination to go into the details of the principle appliances displayed.

Considerable benefit has been received by gas company sales people from instructive talks given by manufacturers' representatives and factory experts at company meetings. Data books containing valuable information, and giving in detail description, operation and method of connecting, costs of operation, etc., have been furnished by many manufacturers in an effort to insure gas companies and consumers getting the proper appliance to meet their demands.

In criticism of the various points raised, you may say that the manufacturer is actuated by a selfish motive, that of selling his goods. That is true in part, but if the manufacturer produces a high standard appliance, sells it honestly, and follows up the sale with experts giving educational talks to the gas company salesmen explaining the construction, utility and talking points, certainly the gas companies will receive the greater profit, because the manufacturer's profit ends with the sale, and the revenue to the gas companies just begins here and continues for years to come.

In concluding, I went to say on behalf of the manufacturers, that you will find them ready, willing and anxious to co-operate with you in anything tending towards popularizing the universal use of gas.

Piping Houses for Gas Lighting.

[From the paper by MR. H. R. STERRETT, read before the Philiadelphia Section, I. E. S.]

Although the Illuminating Engineering Society has primarily to do with the utilization of energy in the form of light, the design of burners and reflectors, the study of the effect of light upon the eye, and determining of the quality and proper quantity of illumination for the great number and variety of conditions under which artificial light is necessarilly used, it is the object of this paper to tell something of the means used to convey that form of light energy commonly known as illuminating gas to the various outlets or points where it is to be converted by combustion into light or heat.

Broadly speaking, any distribution system may be divided into four component parts: mains, services, meters and house piping, each of which contributes equally to the satisfactory supply of gas. Of these divisions the first three are under the gas company's control, and hence are usually properly installed and maintained.

A brief description of the Philadelphia distribution system might now be apropos.

The net work of trunk or principal mains act as feeders for the the thousands of branch pipes which supply gas to all parts of the city. Gas is manufactured at Station "A," located at Point Breeze, and at Station "B," at Richmond and Venange streets, and is forced through pusher mains, usually 20 or 30-inch pipe, under a pressure of from 10 to 70-inch water column, to the various holders or reserve tanks. These pusher mains are so interconnected that if something unforeseen should happen to either of the manufacturing plants, the other could instantly take up the additional load and not endanger the continuity of supply. The holders are filled during the periods of low demand so that when the peak load comes on the gas supply is sufficient. The gas is discharged through governing valves from the holder into the distribution system, which is under a pressure averaging about 3-inch water column. The distribution mains, which range from 6 to 48 inches in diameter, are so interconnected that any break in the system affects but a few consumers. Continuously recording pressure gauges are set in different parts of the city so that any change in the gas pressure due to increased or diminished consumption, perhaps caused by a shifting population, can be adjusted by partly closing or opening the holder valves. In this way the general pressure conditions are kept within certain limits.

The other division of the distribution system, housepiping, is usually installed by plumbers or gasfitters, and is not under the direct control of the gas company. It is, therefore, necessary that this work be properly inspected. The importance of a specification which will thoroughly cover the installation of all interior gas piping cannot be too greatly emphasized. In order that such a specification be of real value, it is necessary that proper laws be enacted to insure the enforcement of the various rules embodied in it.

In New York city, before any gas piping may be installed in a building, it is necessary to obtain a permit from the Bureau of Buildings. which also inspects the work when completed and issues an approval card before a meter may be set. In Chicago all piping must be installed in accordance with specifications issusd by the gas company, whose inspectors supervise the work. In Boston all gas fitters must be licensed, and file a plan of the proposed piping with the Building Department for approval, the gas company supervising the installation. In Philadelphia, where about 375,000 meters are in use, the city government by ordinance requires the gas com-

(*Continued on page 90.*)

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E. P. CALLENDER, President.
A. M. CALLENDER, Vice-President and Treasurer.
CHARLES H. WADELTON, Secretary and Manager.

SANFORD K. CAMPBELL, Editor.

NEW YORK, MONDAY, FEBRUARY 8, 1915.

Improved Appliances.

Last year undoubtedly must be credited with real advances in gas lighting appliances, and this year should show some increases in lighting business if the means are used. The report of the National Commercial Gas Association Committee on Indoor Lighting draws attention to some of the improvements in burner construction and in fixture design, and any who have not seen these new things should lose no time in getting them. Since January first we have learned of two companies inaugurating free maintenance of all appliances, and this kind of service, with improved appliances, will surely increase gas lighting.

Valve Locations.

The New York daily papers find what they consider an inexcusable condition of affairs in the city department of Water, Gas and Electricity, when a break in a high pressure water main was allowed to flood the neighborhood and run for hours because it took all of that time to locate and shut off the valves controlling the section of mains affected. This delay was probably not because there were not records of the valve locations, but that the sketches or maps were not kept where they were available in case of emergency.

This is to draw attention to the importance of accurate maps and sketch records of valve locations kept where they can be quickly found, in addition to the permanent field markers specified for valves and drips on high pressure lines.

A Correction.

In the article on "Sizes of Pipes for High Pressure Gas Mains," by Mr. J. M. Spitzglass, in our issue of January 25th, in the equation numbered "2" on page 51 the figure "5" was inadvertently dropped from the divisor of the fraction in front of the fifth root. The equation should be:

$$d = \frac{1}{5.28} \sqrt[5]{\frac{q^2 s l \left(1 + \frac{3.6}{d} + 0.3\ d\right)}{p\ m}} \quad \ldots . (2)$$

Engineering Foundation for the Advancement of the Arts and Sciences.

On Wednesday evening, January 27, The Engineering Foundation for the advancement of the arts and sciences connected with engineering and the benefit of mankind, was inaugurated. This Foundation was established by the United Engineering Society representing various branches of engineering, with an initial gift of $200,000 by Mr. Ambrose Swasey, Past-President of the American Society of Mechanical Engineers, and President of the Warner & Swasey Company, of Cleveland, O. Addresses were made by Mr. Gano Dunn, President of the United Engineering Society and Past-President of the American Institute of Electrical Engineers; by Dr. Henry S. Pritchett, President of the Foundation for the Advancement of Teaching; Dr. Robert W. Hunt, Past-President of the American Institute of Mining Engineers; and Dr. Alex. C. Humphreys, Past-President of the American Society of Mechanical Engineers, Past-President American Gas Institute, President of Stevens Institute of Technology, and President International Gas Congress.

Mr. Swasey's company is widely known as prominent machine tool builders and the foremost builders of telescopes in the world. Among the instruments which they have designed and made are the famous Lick, Yerkes and United States Naval Observatory telescopes, as well as the great 72-inch reflecting telescope for the Canadian Government, now under construction. Mr. Swasey is also known for his practical efforts towards scientific education and the advancement of his profession, and it may be said that wherever any project is started tending to the development and encouragement of the human element in industry, helping men to help themselves, there the weight of his influence will be found.

Many honors have come to Mr. Swasey for his achievements. He is a member of the Institution of Mechanical Engineers of Great Britain and of the British Astronomical Society; he is a Fellow of the Royal Astronomical Society, is Past-President of the Cleveland Engineering Society, and, in 1900, received from the French Government the decoration of The Legion of Honor for his successes in the design and construction of astronomical instruments. He was a member of the Jury of Awards of the Nashville, the Pan-American and the St. Louis Expositions, and Vice-President of the Jury of Awards of the Jamestown Exposition. In 1905 he served as President of the Cleveland Chamber of Commerce, and the same year the degree of Doctor of Engineering was conferred upon him by Case School of Applied Science.

Welfare Work.

The report of the Consolidated Gas Company of New York, submitted at the annual meeting of the company, takes up in detail the various channels of welfare work which the company is carrying on for its employees. A restaurant equipped with the newest gas and electrical appliances was started last July, and has since then been serving an average of nearly 1,200 meals per day to the employees. A legal aid bureau is maintained where any employee may secure legal service and advice without charge. The Employees' Mutual Aid Society now has a membership of 3,800, and is doing good work in helping those who may be incapacitated from injuries and illness, and free medical attendance is given to all members. Fire drills are frequent in all buildings, and a committee on safety, on which every department is represented, is constantly working to minimize the chances of accident and fire. This committee is helped by a corps of experts who constantly visit the various stations of the company and its affiliated companies. Courses of instruction have been organized in many departments. These include a junior and a more advanced course in accounting, instruction in salesmanship and instruction for men in the department of mains and services. The tuition of all employees who wish to enroll in the correspondence courses conducted by the National Gas Associations is paid by the company, and at the present time 300 employees have taken advantage of this opportunity.

Institute Directors Meeting.

The January meeting of the Board of Directors of the American Gas Institute, in the absence of the president, was called to order by the vice-president, Mr. Walton Forstall, with the following present: J. W. Dunbar, A. E. Forstall, Walton Forstall, W. H. Gartley, C. H. Graf and G. G. Ramsdell, secretary. Mr. Herman Russell attended by invitation as chairman of the Technical Committee.

Announcement was made that the president had appointed as a committee to call on the supervising architect of the Treasury, at

Washington, in connection with gas piping in government buildings, Messrs. W. R. Addicks (chairman), C. M. Cohn, O. H. Fogg, C. H. Nettleton, W. J. Serrill.

The report of the Committee on Revision of By-Laws, suggesting changes thought advisable because of the revised constitution, was adopted, and the new by-laws will be printed in the 1914 *Proceedings*.

Mr. Russell reported that the Technical Committee had decided on the chairmen for most of the committees for the year, and that the membership of the committees would soon be announced.

In the enforced absence of Mr. Klumpp, there was no report from the Public Relations Committee, but it was stated that it was in touch with the Bureau of Standards in connection with the investigation being made by the Bureau upon the conditions of gas supply.

Mr. R. W. Bush, Engineer of Manufacture of the Brooklyn Union Gas Company, was elected a Director to fill the vacancy caused by the resignation of Mr. J. H. Jourdan.

The suggestion contained in a letter from Mr. L. R. Dutton, that the Institute collect accounting forms used by various gas companies was favorably received, and it was decided to ask members of the Institute to send to the secretary copies of their accounting forms.

The suggestions of Mr. Cowdery, Chairman of the Committee on Gas Exhibits, that the Institute father a historical exhibit at the Panama-Pacific Exposition, was referred to the President.

An appropriation of $200 was voted to the Joint National Committee on Electrolysis as the Institute's share of the expenses of the committee.

Mr. W. R. Addicks was reappointed the Institute's representative in the National Fire Protection Association, and it was decided to call the attention of the members of the Institute to the inspection manual, "Field Practice," recently issued by that association.

The Directors then adjourned.

Mr. Gribbel on Character.

In an address to the Civic Club, in Tampa, Fla., Mr. John Gribbel spoke of the future of that city and individuals sharing therein, and his belief in our ability to solve the problems of the future.

He spoke of the need of a civic conscience in working out the growth of a city, pointing out that, though intangible, there is such a thing just as there is an individual conscience. Conscience and character were the things to be sought after by the city as well as by the individual.

"And I firmly believe it is a mistake to think you can legislate character, though I am firmly convinced that character can force legislation," said he, the idea being to show that character should be cultivated. Pointing out that everything one does to improve the individuals of a community is a contribution to the community as a whole, he spoke with approval of the plan for teaching domestic science to colored girls, saying that it will tend to better conditions in their homes and in the homes of many others in the city.

He pointed out that when reforms fail it is because of the note of self seeking in them, and adduced Cromwell, Washington and Robert E. Lee, whom he spoke of as one of the most beautiful characters the Anglo Saxon race has produced, as instances of men who had none of that note in their characters, and who in consequence had been able to do great things. Though the ordinary man's life may not fill so great a space as theirs, every man may in his way do some constructive work. In seeking a reform we must consider most, not what we can get but what we can give.

He quoted the miller of the Dee, "who cares for nobody, no, not I, and nobody cares for me," as a type of unlovable person, and quoted from Foss' poem, "Let me live in a house by the side of the road and be a friend of man," as the type of man he would prefer to be.

Annual Report, New York Commission, Second District.

Figures contained in the annual report of the Second District, New York, Public Service Commission to the Legislature, summarizing the financial operations of utility corporations, reflect general business conditions as they affect these activities.

Though the bulk of railroad business has grown one-quuarter since 1907, there was a falling off in 1914, as comparad with 1913, but only in the matter of dividends paid do the figures fall below 1912, and these were less than any year since 1909. For the year ending June 30, 1914, railroad operating revenues were 2.9 per cent. less than the previous year; expenses increased 1.9 per cent. and resulted in a decrease of net revenues of 14.5 per cent.

Electric railroads show a substantial increase over 1913 in the matter of net revenue, despite increases in expenses, and a growth of 66 per cent. over 1907. Operating expenses increased 6.6 per cent. over 1913; the increase in expenses was 7.2 per cent. and net revenues increased 3.6 per cent.

Electrical and gas corporations report for the calendar year, so that the figures of their business relate to 1913. All classes of light and power corporations showed an increase in operating revenue of 5.7 per cent. over 1912, an increase of 9.2 per cent. in expenses and 10.9 per cent. in taxes, and a decrease in operating income of 0.4 per cent. The figures show that electric corporations are gaining, that the gas departments of combination companies are holding their own; but that coal and water gas companies, while increasing their output and holding their own in gross revenue, show a large decrease in net return, due to increased expenses and taxes and lower rates.

[Official Notices.]

New England Association of Gas Engineers.

The Forty-fifth Annual Meeting of the New England Association of Gas Engineers will be held at Young's Hotel, Boston, Thursday and Friday, February 18th and 19th, 1915.

Papers are being prepared as follows:

"New Vertical Settings at Fall River," C. W. Hunter, Boston.

"Concrete Piles for Holder Foundations," F. E. Drake, Lynn.

"Free Maintenance of All Gas Lamps by Gas Companies," J, P. Conroy, New York.

"Industrial Fuel Gas," W. H. Bradley, Springfield.

"B. T. U. Losses on Medium Pressure Lines," W. O. Brewer, Meriden.

Mr. H. N. Tolles, of Chicago, will address the meeting and be at the annual dinner.

Applications for Membership should reach the Secretary by February 17th.

N. W. Gifford, Secretary.

Pennsylvania Gas Association.

West Chester, Pa., January 9th, 1915.

The Pennsylvania Gas Association, will hold their Annual Meeting in Philadelphia, on April 14th, 15th and 16th. The headquarters will be at the Hotel Adelphia, one of Philadelphia's leading hotels.

A splendid programme has been planned, including excellent papers by well-known men. The entertainment features are in the hands of gentlemen whose reputation has been established for something original and interesting.

It is hoped all members and their friends will be on hand, to make the meeting "Better than ever."

Yours very truly, W. O. Lamson, Jr., Secretary.

Indiana Gas Association.

Office of the Secretary.
New Albany, Ind., Feb. 1, 1915.

The Annual Meeting of the Indiana Gas Association will be held at Indianapolis, March 10th and 11th, 1915. Papers will be read as follows:

"Appraisal of Public Utility Properties," by Wm. G. Woolfolk.

"Industrial Gas," by J. C. Shephard.

"Gas Rates," by J. H. Maxon.

"Application of By-Product Coke Ovens to the Gas Industry," by J. D. Forrest.

"Industrial Safety," by Chas. B. Scott.

"Comparative Costs of Gas and Electricity for Domestic Purposes," by B. K. Cash.

Members of sister Associations are cordially invited to be present.

Yours truly, James W. Dunbar, Sec.-Treas.

(*Continued from page 87.*)

Piping Houses for Gas Lighting.

pany to exercise a supervision over the character of material used and work done in installing gas piping and fixtures. In accordance with the obligation thus created, the company has adopted a specification for fuel and illuminating piping and fixtures. This specification includes the kind of material, methods, locations, etc., to be used and avoided in making installations, a schedule of pipe sizes and lengths for various consumptions, instruction how to properly draft a piping plan, and an explanation of just what is required in the way of inspections by the gas company's representatives. The piping schedule is based on Professor's Pole's formula for the flow of gas through pipes.

The smallest diameter pipe, and therefore the smallest outlet permitted, is ⅜ inch, and this, it is assumed, will usually supply 10 cubic feet per hour, at the average Philadelphia pressure. The capacity of a larger outlet, as compared with a ⅜-inch outlet, varies directly as the areas. In designing a system of piping, after the sizes of the various outlets and the best direction to run the pipes have been determined, it remains to decide the proper size piping to install. This is accomplished by starting at that part of the system farthest from the meter and working toward the latter, determining the proper sizes by consulting the piping schedule. When the first branch line is reached the sizes are again determined by starting at the far end of the branch and proceeding to the junction, where the quantities of gas for the two pipes are added and the same process repeated until the meter is reached. In drawing a piping plan, vertical lines indicate vertical piping, horizontal lines show horizontal piping running lengthwise of the building, and the slanting lines show horizontal piping running across the building.

When no outlets are open the pressure in a system of piping is uniform, except the small differences due to elevation, each ten feet making a difference of about 1/10-inch water column. When a burner is lighted gas begins to flow through the pipes, and as a result of friction, the pressure of the gas at the burner is reduced. Since it is necessary to have a certain volume of gas delivered to a burner, and since the volume depends on the pressure as well as on the size of piping, a certain pressure loss through a system of piping must be used as a basis; so in the piping schedule mentioned a loss of 2/10-inch water pressure between the meter and the farthest outlet is taken as maximum. Then since there is from 25/10 to 35/10-inch pressure on the mains and services, the pressure at an appliance connected to the extreme outlet would be from 20/10 or 30/10-inch, there being about a 3/10-inch additional loss through the meter. Due to the fact that there is a certain unavoidable variation in pressure over an area as great as that included by our city limits, gas appliances are usually equipped with means of adjusting the burner to take care of the different pressures.

In Philadelphia three inspections of interior piping are made by employees of the gas company working for the combined interest of consumer and company. When an installation is ready for the first inspection, which is made while the piping is still exposed, a plan of the system or extension plotted on a regular form, is forwarded to the gas company. The inspector compares the installation with the plan, and tests the piping for leaks, a pressure of 3 pounds per square inch, indicated by a 6-inch mercury column, being applied for 10 minutes. If the rules have been complied with and the system is tight, a certificate of first inspection is issued and the piping may be covered. If any changes are necessary, they must be made before the certificate is granted. After all carpenter and other building work that might disturb the piping has been finished, and after the last coat of white plaster is on, the plumber must apply for the second inspection, which is simply one of pressure, made before any fixtures are hung. A pressure test identical with that of the first inspection is made, and if the piping is tight a certificate of second inspection is given. After the fixtures are installed and the system is ready to receive gas, the third inspection must be applied for. The entire system is now put under a pressure of 6-inch water column, and must show no drop in 10 minutes. Fixtures are examined for poor workmanship, objectional design, etc., and all fixture cocks are carefully measured with a special gauge to determine whether they comply with fixture cock specification.

There is very little to say about the actual physical installing of house piping. It is simply a case of determining the proper location and approximate consumption of gas for each outlet, and joining the various outlets to the riser, being careful that the pipe is of the correct sizes, properly supported, sloping in the right direction, etc. In ordinary dwelling houses a system of house piping usually consists of a riser, or pipe running vertically from a point in the basement near the meter, supplying gas at each floor to a branch pipe to which are connected the various outlets on that floor. In larger dwellings two or more risers may be run, all supplied by one meter; while in the case of apartment houses a separate riser and meter supply each apartment. The meters are always installed in the basement, and in cases where the number warrants, a special meter room is built. In modern manufacturing buildings it is the custom to install a trunk or commor riser, meters being set on each floor for the tenants occupying it.

In most cases horrizontal gas piping is run parallel with and under the floor boards, which not only makes it more convenient if the piping should need to be uncovered, but also assures that it is supported by the joists, which should be notched-out for it as near their points of support as possible. Vertical pipes are usually run in partition walls. Wherever possible it is preferable that gas piping be exposed to view. Piping may be laid level, but if not it should slope toward an outlet where any condensation formed can be conviently drained off.

After a system of piping has been properly installed, it needs very little attention under normal conditions. In time a certain amount of scale may form inside the pipe, and if this collects at any point the area will be reduced and the pressure lowered. thus causing complaint from the consumer that the supply is insufficient. By shutting off the gas at the meter and blowing air through the pipes by a hand-pump, these obstructions can usually be removed.

The decision as to where each outlet should be placed to give the proper distribution of light should be made by an illuminating engineer. Of course, there are innumerable small houses where the rooms, usually square or oblong, do not allow fixtures other than central pendants or wall brackets, and in those cases it is not important that the outlets are located by one who knows little or nothing about lumens, foot candles, glare, coefficients of reflection, etc. On the other hand, there are thousands of larger residences, apartment houses, commercial buildings, and school houses, where the size of the room does not limit the type or location of lighting fixtures, and in such structures the location of the light sources should rest with one who is familiar with the principles of illumination.

The writer's attention was recently called to an instance where, in the better class of dwelling, the living room was very poorly illuminated, due to improper location of the outlet. By placing the fixture a few feet to one side the lighting could have been greatly improved. This is a case where good illumination was evidently sacrificed in order to do away with running the extra pipe. In piping houses for gas, the outlets should be properly located and the piping run to the outlets, instead of, as is the rule in many cases, locating the outlets according to the easiest and cheapest system of piping. If the members of the Illuminating Engineeing Society, when the opportuity presents itself, will emphasize this point, better illumination will result in many instances.

The cost of installing a complete, modern system of gas piping put in at the time the building is erected, varies from ⅛ of 1% to 1% of the total cost of the building. These figures are based on the analysis of a large number of cases, ranging from an ordinary residence to large office and commercial buildings.

Theory of the Coking Process.

A sample of coal containing ash 4.64, water 9.66, nitrogen 1.32, hydrogen 4.86, carbon 82.88, total sulphur 3.35, sulphur in ash 0.32, combustible sulphur 0.03%, when heated in an experimental coke oven gave a molten product sufficiently fluid to flow from a small opening in the base of the oven. This product quickly solidified to a shining black mass, containing ash 10.47, water 0.50, nitrogen 0.14, hydrogen 2.99, carbon 76.86, total sulphur 3.63, sulphur in ash 2.18, combustible sulphur 1.45, oxygen 7.59%. The whole of the organic constituents volatilized when the product was heated in a covered crucible, leaving only the ash. This behavior resembles that of tallow, wax and paraffin and some resins, and the author concludes that during the coking of a coal of this type a mixture of compounds, consisting of the degradation products of the resinous and fatty constituents of the original coal-forming materials and also the pitch-like polymerized products of distillation under pressure, is completely melted, and decomposes on further heating without leaving any carbon residue. The decomposition products react chemically with the degradation products of the cellulose and protein constituents of the coal-forming material, cementing them into a carbon-like compound or mixture of compounds. At higher temperatures the protein degradation products in the coal soften, and during the complete gasification of the coal, stable compounds are formed containing sulphur and nitrogen, and these compounds are present in the coke. ("Stahl and Eisen.")

Reflection from Painted Surfaces.

By Dr. Louis Bell in *Electrical World*.

Calls for information on the coefficient of reflection to be expected from painted surfaces suggested to the writer the propriety of recording some of his experiments of the past few years. He has examined a great number of samples ranging from white to dark buffs and greens, and the range of coefficients found in them is about the same as that recorded in a paper on coefficients of diffuse reflection based on examination of wall papers.

The point of special interest as respects the coefficient of reflection of paints is associated with their use for ceilings and walls from which artificial light is reflected. Ceilings, as a rule, are fairly light in tone; but walls are sometimes, through ignorance or an eccentric idea of esthetics, painted so dark as to render lighting exceedingly difficult. Just now there is a strong tendency toward indirect and semi-indirect lighting, and the importance of choosing proper paints is evident. These methods are none too efficient even under most favorable circumstances, and by the choice of an improper wall color it is very easy to defeat the design of the illumination.

The experiments made by the writer were very simple. The coefficient of samples laid upon firm cardboard was determined in the following manner: The diffusing disk was removed from a Lummer-Brodhun screen on the photometer bar and replaced by two slips of white bristol board cut side by side from the same sheet, the similar surfaces of the two slips placed together. Then, with the carriage at the middle of the bar, an incandescent lamp of medium power was placed at each end of the bar, and to the voltage on one of them such slight variation was given as might be necessary to balance the illuminations on the bristol board screens. After this was done the samples of paint laid on cardboard were trimmed to the necessary size to substitute for one of the bristol-board standards, and the photometer was then balanced in the ordinary way, giving the relative reflecting power of the two surfaces for light incident at 90° and returned at moderate degrees of obliquity. The reflecting power of the standard cardboard having been ascertained in absolute measure by direct observation, the coefficients of the samples of paint were at once ascertained.

Reflection from Painted Surfaces.

Color.	Kind of Paint.	Per-centage Reflec-tion.	Remarks.
White	Oil	65.7	
Extremely faint cream	Oil	63.0	
Faint cream	Water	59.2	
Faint cream	Water	55.4	
Light cream	Oil	52.8	
Light cream	Water	52.0	
Pale yellowish	Oil	51.4	White with stone yellow
Faint buff	Water	51.0	
Pale yellowish	Oil	51.4	White, lemon, chrome yellow
Light yellowish	Oil	48.0	White, stone yellow
Pale yellowish	Water	46.8	
Very faint greenish	Oil	46.0	White, chrome yellow, chrome
Very faint greenish	Water	45.8	[green
Faint grey	Oil	45.6	White, stone yellow, black
Pale greenish	Oil	45.0	White, chrome green
Pale yellow green	Oil	44.5	White, chrome green, chrome
Pale greyish buff	Water	44.0	[yellow
Light greenish	Water	43.0	
Light greenish	Water	43.7	
Light greenish	Water	43.1	
Medium buff	Water	40.2	
Light greenish gray	Water	38.6	
Light olive	Water	32.7	

This method is very easily applicable for all light shades because the color difference involved is not enough to make any considerable disturbance of the settings. Even on the darker shades the color was seldom strong enough to make trouble, for as a rule paints used for interior finish are not brilliant enough in color to interfere in photometry. The annexed table gives coefficients for colors commonly used on ceilings and walls where any attempt is made to secure a light surface such as one would choose with some regard to the effect on the illumination. The highest percentage obtained is 65.7 for a practical white oil paint of medium gloss selected as being a good reflector. It is difficult to get much above this figure with commercial paints adapted to general use. The next in the order of excellence is the same paint with the very faint cream tinge. Less than half the samples showed coefficients above 50%, and those that did so were of very light cream or yellowish tones. They included both water and oil paints, though the indications are that a carefully selected oil paint is rather the better of the two as regards reflection. The deeper tones of yellow and the faint green tones fell decidedly lower in reflecting power, and those of stronger tint lower still, ending with a rather light olive water color at the bottom of the list with 32.7%.

All the colors that showed a good reflection value were tinted, if at all, with the merest trace of yellow pigment, presumably chrome or stone yellow. The least trace of black in the pigment, such as would give only the faintest suggestion of a grey tone, is fatal to good reflection, and the same is true to almost an equal extent of red. A very light grey, "warmed a bit" with red, gives a tone extraordinarily deceptive, since it looks very light and really absorbs an astonishing amount. The greens are distinctly worse than the yellows, but a good deal better than even the lightest blues. Blues, however, are rarely used on account of the general cold tone.

The table is merely a rough guide to the tones fairly adapted for indirect and semi-indirect lighting. One must remember that the values given are for absolutely fresh and clean samples; the effect of dust is, of course, to darken any painted surfaces, thereby lessening the reflection. In this respect water-color paints are more objectionable than the oils, because they will not stand cleaning. Except in the case of an oil painted surface so situated that it can conveniently be cleaned rather often, it seems unsafe to rely on an ordinary coefficient of reflection greater than 50%. There is no reason why ceilings should not be practically white at the start, but walls are generally tinted, often to fairly dark tone, and in such case the effect on the general lighting, even when the indirect system is used, must be borne in mind. Two rooms, with white ceilings, lighted to very nearly the same degree in initial intensity will show very material difference if one has, for example, light buff walls and the other fairly dark green walls. The coefficients of the darker paints is very low.

Explosion of Ammonia Vapor.

The explosibility of mixtures of ammonia vapor and air has been studied at the Technical College at Carlsruhe, and the results are published in the *Journal fur Gasbeleuchtung*. The seeming reason that such mixtures have been thought not to be explosive was that tubes or narrow burettes were used in the old investigations, and the cooling effect of the walls of the tubes on explosive mixtures is now known to be very great.The mode of ignition also affects the occurrence of explosion in a mixture. A spherical vessel is most favorable for combustion or explosion, and ignition should be at the centre of the vessel. In these investigations the spark for ignitions was from a 10-volt accumulator with an induction coil and a long pendulum contact breaker. The pendulum made contact for exactly the same length of time in each test through a platinum point passing over the domed surface of mercury at the top of a tube about an inch in diameter; the pendulum connected to one pole and the mercury to the other pole. The electrodes in the explosion vessel were of 0.3 mm. platinum wire, the ends 6 mm. apart.

It was found that an explosion occurred with perfectly dry ammonia and air dried by passing it over concentrated sulphuric acid; but if the air were further dried by passing over phosphorus pentoxide, no explosion ensued. Constant humidity was secured for the remaining experiments by passing the air through dilute sulphuric acid (specific gravity 1.340) having an aqueous vapor tension at 20° C. of 8.494 millimeters.

Using as the explosion vessel a spherical bulb 110 millimeters in diameter, having a capacity of about half-a-litre; it was found that under these conditions the explosive mixtures of air and ammonia ranged from 16.5 to 26.8% by volume of ammonia. In a Bunte burette, 19 mm. in diameter, and with a spark-gap of 2 mm. no explosion could be produced, but continuous combustion was observed between the limits of about 19 and 25% of ammonia. The mixture corresponding with the combining proportions of ammonia and oxygen is 21.9% by volume of ammonia with air.

Suggestions for a Uniform State Workmen's Compensation Law.

The National Civic Federation Committee, its members appointed by State Industrial Accident Board and Workmen's Compensation Commissioners, either administering laws or studying the subject, and by Governors of States that have not yet enacted such a law, has issued a final draft embodying its recommendations to the State Legislatures meeting this year. They are as follows:

PROPOSITION I.—System to be provided for: (a) We see no reason why The National Civic Federation should depart from its original position that the plan to be provided for should be a compulsory system of workmen's compensation.

(b) The system provided should be exclusive of all other remedies.

II.—Employments covered: The act should be of universal application to all employments, except, of course, those which are exclusively controlled by the federal law.

(NOTE: We see no reason why the application of the act should be limited to alleged hazardous employments, as the economic loss is just as great regardless of the manner or occupation in which the injury occurs, and, furthermore, it is impossible to predetermine a hazardous occupation because this is largely a question of fact to be determined after the accident).

III.—Injuries covered: Should include—Only injuries and death by accident arising out of and in the course of employment.

Should exclude—(a) Injuries occasioned to the employee by the willful intention of such employee to injure himself or another.

(b) Injuries resulting solely from intoxication of the injured employee.

(c) Casual employments.

IV.—Insurance: The statute should secure payment of compensation, and hence provide for compulsary insurance, but all responsible and authorized methods of insurance should be preserved including self-insurance under proper provisions.

V.—Notices: An injured employee should be required to give within a reasonable period adequate notice of the injury and of any resultant serious complication unless from the facts knowledge by the employer or his superintendent might fairly be presumed.

VI.—Administration of the law: The appointment of a commission should be provided for, having the power of a jury to pass upon questions of fact and the power of a court of first instance to pass on the law. The courts should be deprived of power to set aside the findings of fact, except in cases where under the present law they can set aside the findings of juries.

On the law appeals should be permitted.

Rules of procedure to be formulated by the commission.

Where State insurance is provided for, the administration of the insurance fund should be in a separate department from the board which administers the compensation law.

VII.—Schedule: (a) Compensation should be bassed upon the average earnings of the workman in the grade in which employed when injured.

(b) A definite percentage of the loss of earnings should be paid periodically in compensation for injuries and death.

Death benefits: (a) In principal, payments on account of death should be made periodically, and the percentages should be based upon the number and relationship or extent of dependency of the next of kin, it being preferable, under ordinary circumstances, to fix definite percentages for those relatives who may reasonably be presumed to be dependent, rather than to leave open the question of dependency. All questions as to beneficiaries and dependency to be determined as of the date of accident.

(b) A minimum percentage should be paid where there is one dependant, and an appropriate percentage added for each additional dependent up to the maximum percentage allowed. A distinction should be made between allowances to persons partially dependent and those wholly dependent.

(c) There should be a limit in time over which payments are to be made to beneficiaries.

(d) Certain contingencies should be covered under which payments will cease, such as remarriage of widows, death of beneficiaries and lapse of time.

(e) A reasonable allowance should be made for funeral expenses.

Injury benefits: (a) No compensation should be paid for the first two weeks of disability.

(b) Should be based upon the extent of the disability for injuries that are temporary in character. Definite periods of time over which periodical payments will be made should be fixed for injuries involving permanent partial and permanent total disability.

(c) Provision should be made whereby the employer shall be required to furnish all medical and surgical aid and assistance to the injured employee that may be reasonably required, for a reasonable period of time, but subject to such conditions and regulations as may be best calculated to guard this liability from abuse.

VIII.—General provisions: Some inducement should be given to employers to re-employ injured men, especially where the law provides for the payment of compensation for definite period of time.

(a) Notwithstanding any obligation to pay compensation, if the employer continue an employee in his service, compensation in case of injury to be suspended while the injured employee is at work and for which he receives wages which do not fall below 90% of the wages he was receiving at the time of the accident. If his wages received fall below such 90%, an amount of compensation equal to the difference between such 90% and such wages should be paid. The time during which the employee is at work should effect a reduction to that extent in the aggregate period for which payments would otherwise be made.

(b) In order that the maimed and partially disabled may not be excluded from employment, provide that if an employee receive an injury which, of itself, would only cause permanent partial disability, but which, combined with a previous injury, does in fact cause permanent total disability, the employer should only be liable as for the permanent partial disability, so far as the subsequent injury is concerned.

(c) Provide in death cases and in cases of permanent total disability, other than where men are re-employed, for a payment to the commission of a lump sum, based upon the present value of the obligation to make periodical payments. (Note: This would remove the danger of non-payment of compensation over a period of years on account of the insolvency of the employer.)

(d) Provision should be made for lump sum payments only to non-resident next of kin of aliens and in an amount considerably less than that paid to residents.

IX.—Method of payment; whether through commission or by employer direct: There is a difference of opinion among the members of the Civic Federation as to whether or not payments should be made through a board or direct by the employer to the employee. It has been suggested that provision be made for payment direct in cases involving temporary disabilities and permanent partial disabilities, and through a board in cases of death and permanent total disability.

X.—Miscellaneous: The proposed act should include the following provisions—

(a) Right of physical examination of injured employee by employer or his agents.

(b) Commission to have the right to modify awards with changing conditions.

(c) Compensation unassignable and exempt from claim creditors.

(d) Regulation of attorneys' liens and fees.

(e) Proper limitation as to time of asserting claim.

(f) Adequate provision for enforcing the law.

Discoloration of Sulphate of Ammonia.

A recent report to the German Coke Commission treats of the causes of discoloration of sulphate made in coke plants. The fact that it is rarely if ever pure white is due generally either to irregularities of operation and in scrubbing the gas, or to impurities in the sulphuric acid used. For example, if running at temperatures higher than usual, some tar will not separate and the particles will be carried forward in the gas. In the case of direct recovery processes these tar particles will be deposited in the saturating vessel and color the salt. In other systems the tar will be carried forward by the liquor to the ammonia separating apparatus.

On the other hand, a gray salt may be caused by small quantities of copper or lead in the sulphuric acid used. These sulphides are deposited with the sulphate, and cause discoloration, especially when closed concentrating vessels are used. The coloring power of acids containing impurities is not always the same. Experiments made by the author show that a 60° acid with a copper content of 0.01% gave the salt a distinctly greyish tint. With 0.03% of copper the fresh salt was a dark grey, which, however, becomes distinctly lighter during storage, the easily oxidizable copper sulphide being converted to the sulphate, which gives very little color. The coloring effect of lead impurity is much less, and its effect is later in the acid bath than with copper. The acid could have 0.03% of lead before any distinct color was noticed in the sulphate, and 0.1% before dark grey showed. But grey from lead does not decrease during storage.

The formation of a blue salt, according to Bailey, is due to the action of volatile cyanogen compounds on the iron contents of the acid, and can only occur when alkalinity produces a precipitate of ferrous sulphide, with which the alkaline cyanides entering the saturator can interact; and if the saturator is kept sufficiently acid, blue salt should not be made except when excessive priming occurs. The only way of avoiding the possibility of blue salt is to remove the cyanogen compounds from the liquor before distillation. Some suggestions on this are given in the work of Lunge and Köhler. This purifieation of the liquor would avoid the red coloring observed at times, which is traceable to sulpho-cyanide compounds of iron. This is generally noticed after storage, and is in proportion to the oxidation of the iron salts. For instance, the outer layer of salt in storage piles often becomes red, while that underneath remains white. It is difficult to avoid this as most commercial sulphuric acid contains about 0.02% iron in solution.

Brown or yellow-brown discolorations can usually be traced to tar oils, but not the yellow tints. A definite yellow tone is almost always due to arsenic in the acid. Experiments show that 0.01% of arsenic just colored the sulphate, while 0.03% gave a strong tinge. But as the acid often contains a small quantity of copper with the arsenic, and tarry particles get into the acid concentrating bath, the yellow color often turns grey and brownish-yellow. For example, with 0.01% of copper and 0.03% of arsenic you get a grey-brown salt, with perhaps a trace of yellow. But if the copper is increased to 0.03%, the arsenic remaining the same, the salt will be dark grey. The degree of oxidation of the arsenic may also have an important influence. If it is in the form of arsenical acid, the yellow color is less than with arsenious acid; for the reduction must be complete before sulphide is formed. Other things besides arsenic can cause the yellow color. Sometimes the scum formed on the saturating bath is of a yellowish-brown color, when the acid shows only traces of arsenic—0.005% at the most; so that the color of the salt could not be attributed to it. The salt when tested left an insoluble residue resembling the scum from the saturator. The latter was washed, dried and analyzed, and found to contain as high as 28.83% of cadmium sulphide, as against only 5.1% of arsenic (in the form of trisulphide). The same sample showed 33.65% lead sulphide, 9.25% zinc sulphide, and 13.3% of residue soluble in carbon bisulphide. In this case, and others quoted by the author, the yellow color was undoubtedly due to the cadmium, and the acid, when tested, contained 0.053 to 0.013% of cadmium. Such acids should therefore be avoided. Tests on the coloring effect of cadmium showed that 0.01% in the acid was sufficient to make the color yellow, with a tendency towards red, distinctly stronger than that caused by arsenic. Quite a dark yellow is caused by 0.03% of cadmium; while with 0.03% of arsenic and a like quantity of copper is sufficent to occlude the yellow tint.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,123,869. Process for the Reinforcement of Gas Mantles of the Incandescent Type for Illuminating Purposes. G. T. Hadley, San Francisco, Cal.

1,123,887. Gas Lamp. G. Keith, London, England, assignor of one-half to J. Keith, same place.

1,123,898. Gas Saver. J. W. Langendorfer, Philadelphia, Pa.

1,123,981. Gas Mixer. Reinhold Bergfeld, Berlin, Germany, assignor to Berlin-Anhaltische Machinenbau-Aktiengeselschaft, same place.

1,124,123. Gas Lighting Apparatus. A. H. Francks. Tottenham, England.

1,124,364. Process of Manufacturing Gas. B. Van Steenberg, Goshen, N. Y.

1,124,383. Lighting Device for Gas Burners. E. S. Allen, New York city.

1,124,432. Gas Analysis Apparatus. C. W. Heath, Cincinnati, O.

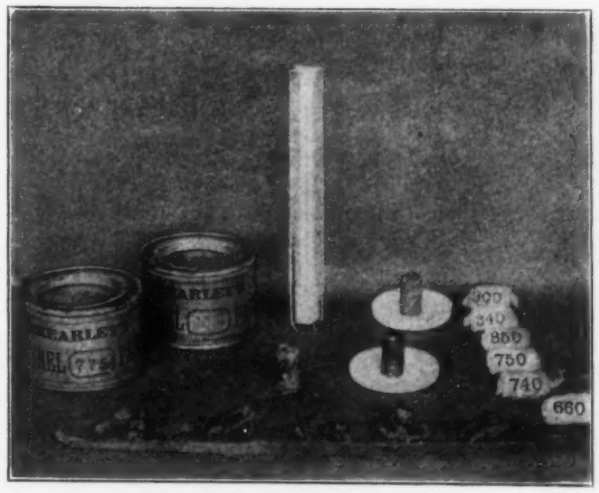
1,124,646. Combination Gas Burner and Water Heater. G. Pahl, Chicago, Ills.

1,124,975. Prepayment Meter Mechanism. A. M. Torrey, Ashland, N. J., assignor to Helme & McIlhenny, Philadelphia, Pa.

1,125,000–1–2. Prepayment Meter Mechanism. W. L. Brown, Landsdowne, Pa., assignor to Helme & McIlhenny, Philadelphia, Pa.

New Methods and Appliances.

Measuring Temperatures by Melting Metallic Salts.—A method for measuring high temperatures recently developed is based on the principle that various metallic salts when mixed in different proportions melt at different temperatures. The method can be employed in place of pyrometers and temperatures from 425° and 2,425° F. determined, The salts may be kept in solid cylinders, 7/16-inch in diameter and ¾-inch long, similar to those shown standing in the illustration, and by using the porcelain saucer the salts are not wasted.



The cylinders shown wrapped, are marked with numbers designating the temperature at which they melt. For temperatures below 932° F., the "Sentinel" pyrometers, as they are called, can be used in air-tight glass tubes, similar to the illustration and the salts can be used over and over again.

The salts can be had in a paste, that in 1 of the tins shown being enough to make 200 or 300 determinations. Pastes with various melting temperatures can be inserted into furnaces, ovens, retorts, flues, pipes, etc., to determine the temperature under which they are operating.

Local Case-Hardening.—The local case-hardening of steel objects was recently discussed before a French Society, and the methods employed summarized as follows:

1. The parts to be protected against cementation are covered with fire clay. This protection is not complete, as the gases penetrate the fire clay. For complex shapes the method becomes complicated and expensive.

2. A tube is shrunk over the parts to remain uncemented, the thickness of the tube being slightly greater than the depth of case required. After the end of the cementing process the tube is broken off. This method is very limited in its application.

3. The object is made with extra thicknesses in those parts which must not be hardened. After cemmentation and before hardening, these extra thicknesses are machined off. This process is very expensive.

4. The parts are protected by a metallic deposit which must be (a) solid at the cementing temperature, (b) impervious to the cementing materials, (c) easily obtained commercially, and (d) easily removed after the operation. Copper and nickel are the only metals which fulfil conditions (a) and (c), and the latter fails to comply with condition (b).

The metal may be deposited by immersion in a salt solution by electrolysis, or by the Schoop spraying process. The first-mentioned is not satisfactory owing to the thinness and uncertain adherence of the coating. The electrolytic process is cheaper to install than the spray process, which, on the other hand, is quicker and more easily localized.

A Two and Four-Cycle Gas Engine.—A gas engine recently developed is started as a two-cycle engine and afterward changed over to a 4-cycle unit automatically. It is pointed out that the engine is thus easily started, having an explosion for every revolution until the desired speed is obtained, when it operates on the four-cycle principle. The engine can be run in either direction. A number of different sizes are built from 2 up to 20-horse power.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Trustees of Susanville, Cal., have passed a resolution to grant H. Howard Dunbar a franchise for a gas plant, and have ordered a notice of sale of franchise published.

THE officers which have been directing the separate operations of the artificial and natural gas departments of the Dayton (O.) Gas Company have been combined, and all business will be directed in the future from the office at the corner of East First and St. Clair streets.

EXTENSIVE improvements are being made by the Glens Falls (N. Y.) Gas and Electric Light Company to the plant in Canal street. A contract has been awarded for a coal hauling system, which will eliminate the present method of transporting coal from the railroad to the works by teams. The D. & H. tracks have been extended to a point opposite the works and the installation will include a conveyor to transport the coal from the tracks to the hopper at the entrance of the retort house, where it will be weighed and then charged into retorts. A contract has been let to Waldo Brothers for the installation of two outside producer type benches, each with a capacity of 120,000 cubic feet of gas in 24 hours. Among other improvements is a cement settling well and an ammonia plant.

PHILADELPHIA'S receipts under the gas lease to the United Gas Improvement Company amounted last year to $101,489 more than in 1913, the city's revenue from gas sales being $1,948,466. The report made to the City Controller shows that the total quantity of gas sold to Philadelphia consumers last year was 9,807,711,480 cubic feet, as compared with 9,624,767,780 in 1913.

THE "Iron Trade Review" says: "The efforts of many cities to provide employment for thousands of men now idle include the laying of water pipes, and the demand for cast iron pipe shows decided improvement. Chicago will soon place contracts for 16,000 tons and numerous other cities will place considerable tonnages. The United States Cast Iron Pipe and Foundry Company has been awarded 7,200 tons by the Providence (R. I.) Gas Company.

THE city council of Portsmouth, Va., will shortly take up the question of cheaper gas rates in the city of Portsmouth with a view of having the same placed in operation with the expiration of the present franchise of Portsmouth Gas Company.

THE Grand Rapids, Mich., special council gas committee has been to Kalamazoo to confer with W. C. Newbigging, English survey expert. The council has adopted recommendations of the special gas commission to submit municipal ownership to electors at March primaries; submission of 75-cent gas rate, and referendum on new franchise to gas company on basis of 75-cent rate.

THE Chaplin-Fulton Manufacturing Company, Pittsburgh, Pa., report a brisk demand for governors for both natural and artificial gas. They see a continual growth of high pressure distribution.

"M. E." SAYS a permit to do business in any part of Bell County, Tex., has been granted the Temple Gas Light Company, and it now looks promising for an era of activity in this section in the laying of pipe lines, as it was intimated several weeks ago that the gas company contemplated extensive operations with the securing of the franchise. It is generally understood that a number of neighboring communities may be receiving gas made in Temple within the next few months.

THE Worcester (Mass.) Gas Light Company has planned extensive work for this year. While the total feet of pipe to be laid is not so great as in 1914, the tonnage is much more, because bigger mains will replace several of the smaller ones. In Harlem street the present main will be replaced by a 20-inch pipe 1,770 feet long, and will connect with a new main in Vernon street 2,520 feet of 16-inch pipe, and a 24-inch main in Quinsigamond avenue. To provide for increased service in Greendale a 16-inch main will be laid in West Boylston street.

CHICAGO'S City's Comptroller has received a check for $34,255.92 from the Peoples Gas Light and Coke Company, representing 5% of the gross receipts from the sale of natural gas for the year ending Dec. 31, 1914. It is an increase of more than 10% over the amount received for the year 1913. That year the revenue paid to the city was $30,981.02.

A MEETING of the employees of the Gloucester (Mass.) Gas Light Company, called by William H. Coffin, Superintendent, was held in the company's office to hear a talk on "The Proper Manner for Employees of a Public Service Corporation to deal with the Public," by Mr. William Gould. The talk was very much enjoyed by the men. A club was formed for the promotion of good fellowship among the men and to improve the efficiency of their work and the service to the public. Herman R. Marchant was elected President and Alfred C. Tarr, Secretary of the new organization, and George L. Goldthwaite and Walter W. Wiley were appointed as an entertainment committee for February.

THE City Commissioners of Bismark, N. D., have deferred final action in the matter of granting a gas franchise until reports from various city commissioners and the city engineer who inspected the plant at Valley City are heard, together with a report by Mr. Ployhar, petitioner, and President of the Valley City Gas Works, as to the plans and specifications he intends to carry out should the franchise be granted.

THE Providence, R. I., Aldermanic committee on street lights is giving considerable attention to the proposition providing for the equipment of boulevard gas lights with a device for automatically lighting and shutting off the lamp. Through the Fall River Gas Company, Superintendent Wolstenholme procurred half a dozen automatic lighters and installed them 6 months ago. The committee has inspected these lights and the automatic arrangement, and those in charge of the lights say it is working well.

THE Municipal Gas Company, Albany, N. Y., has purchased the Gainsborough at 122, 124 and 126 State street, and on the site will put up a large office building with elaborate show rooms on the first floor. The officers have felt for some time that the building at 112 State street is inadequate and have taken advantage of the opportunity to buy the Gainsborough for larger quarters. In the new offices the salesrooms of the gas and electric departments will be combined and a special effort made to display goods with the utmost selling effect.

AN early morning fire two weeks ago did serious damage to the office of the Concord (N. C.) Gas Company. The fire originated between the two stories, in the floor, and did most of its damage to the stock of the gas people on the ground floor, the damage amounting to some $3,000, principally by water and to gas fixtures.

MR. JOHN T. SMITH, president of the Southern Dutchess Gas and Electric Company, who is now in a controversy with the committee of the City Council of Beacon, N. Y., on light investigation, and who recently raised the question of comparison between the price of gas and the price of water, offers to buy the city water plant and sell water at the same rates he asks for gas, just half the rate charged by the city.

THE total amount of bonus distributed by the Milwaukee (Wis.) Gas Light Company, in accordance with its custom, for the six months ending December 31, amounted to $19,630, which went to 468 employees. To be eligible under the bonus rule an employee must have been in the company's service for a year and a half, or three six-month periods, and shall have reported for work for five and a half months out of each six-months period. Special provision is made for allowances for sickness and for injuries received in the gas company's service. The distribution this time, as for a number of periods past, is on the basis of 10% of the wages received during the six months in question.

A CORRESPONDENT writes that the Geneva, N. Y., patrons of the Empire Gas and Electric Company are depending upon the opening of the new water gas apparatus at the local plant to improve the quality of the service in that city. It is expected that the completion of the new machine will take some of the load from the plant at Border City, and so improve the gas in Geneva and other towns served by the company.

THE Springfield Navigation Company, promoted by the Springfield Gas Light Company, has bought equipment for more extensive coal service on the Connecticut river. The company uses 225 tons of coal a day, and by water service it can be procured at a rate cheaper than the present by 25 cents a ton. A new 65-foot tow-

boat has just been completed at Windsor Locks, Conn., and the company has bought the yacht, "Emilie S." Three new coal barges also are under construction, representing an outlay of $12,000. Some $50,000 has been expended in building a steel overhead trestle from the storage bins to the wharf at the foot of Bliss street, and the coal will be taken from the barges by derrick and run by an electric third-rail system to the bins. The new power towboat is equipped with an 8-inch sand pump, which will permit the boat to be used as a dredge. The "Emilie S" is being remodeled as a towing boat and a pleasure yacht, the cabin being finished in the finest style, with staterooms and all appointments, and an electric searchlight system for handling coal at night.

AT the annual meeting of stockholders of the General Gas Light Company, Mr. A. H. Humphrey, President and General Manager, was re-elected; Dallas Boudeman, Vice-President; J. J. Knight, Secretary and Tresurer, and W. M. Blinks, Assistant Secretary and Treasurer. F. J. Humphrey, J. W. Adams and George Bardeen, Sr., were elected as new members to the Board of Directors.

THE past year has seen a marked increase in the business of the Vinton (Ia.) Gas Company, there being now over 600 patrons. At a recent meeting of the stockholders the following directors were elected: Bert Bills, E. T. Bryant, A. C. Ward, W. S. Goodhue, Jay Countryman. The officers elected were: President, Bert Bills; Vice-President, A. C. Ward; Treasures, W. S. Goodhue; Secretary and Manager, Jay Countryman.

THE Tyler (Tex.) Gas Company has just finished the installation of a new water gas machine with a capacity of 400,000 cubic feet of gas in 24 hours, and it is said will make 950 B. T. U., which is 100 more heat units to the cubic foot than the former gas, which means a saving to the consumer. About six or seven weeks ago the Tyler gas plant was practically destroyed by fire and the improvement in the plant is the result of that damage.

AT the January dinner of the heads of departments of the Boston Consolidated Gas Company, at the Parker House, Mr. Herbert N. Cheney, Engineer in charge of construction, gave an illustrated talk on the construction work of the past year. About 50 attended.

THIRTY-FIVE employees of the Lansing (Mich.) Fuel and Gas Company took part in the annual banquet and social session of their Progressive Club. The club is made up of employees from all departments of the company's service, including the plant, offices, distribution and service departments. Officers were re-elected and a program of informal entertainment provided.

OFFICIALS of the Lakeland (Fla.) Gas Company have just made an inspection of their holdings there, those in the party being President John Gribbel, Vice-President and Treasurer D. J. Collins, Roscoe Nettles, manager and secretary, and J. D. Shattuck, engineer. These gentlemen state that material is already on the road for the plant, which will take about five months to build. The actual work on the plant will begin in about two weeks, at which time the foundations will be laid and other preliminary work started. Manager Nettles stated that in less than fifteen months the entire work will be completed, and Lakeland will be able to boast of one of the finest and most up-to-date gas plants in the state.

A BILL providing that employees of public service corporations may have the right of appeal to the State authority supervising such corporation in case of any unsatisfactory working conditions was heard by the Committee on Judiciary of the Massachusetts Legislature. A representative of employees of certain lighting companies said the Legislature has established the right of stockholders to appeal to State authority in case of unsatisfactory financial conditions, and employees should be given the same opportunity to improve working conditions. He said that some companies absolutely refuse to treat with their employees as individuals. Former Attorney-General Albert E. Pillsbury, representing the Massachusetts Association ef Gas Companies, said that there was no need for such legislation; that his clients have no trouble with their employees except when labor organizations stir it up. William A. Wood, representing the Boston Consolidated Gas Company, said there never had been a time when any employee of that company could not appeal to the superior of any official whom he did not like.

UTILITIES COMMISSION NEWS.

KANSAS COMMISSION.—United States Senator Joseph L. Bristow will be appointed a member of the commission when his term in the Senate expires on March 4.

URGE ENGINEER FOR IDAHO COMMISSION.—A Committee of Spokane (Wash.) engineers, members of the American Institute of Electrical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers and American Institute of Mining Engineers, has written to Governor Alexander, of Idaho, urging the appointment of an engineer as a member of the Public Service Commission of that State.

The letter expressed the belief "that there is a well-founded tendency of late among State executives and legislative bodies in the appointment of members of utility and other regulative commissions to recognize that engineers are fitted for such positions. Their training, education and experience render them more peculiarly qualified to deal with the large economic, industrial and development questions incident to State government than any other body of men. As a consequence their services are requisitioned more and more for the betterment of efficiency, expedition and service.

"We know that there are in Idaho many accomplished engineers. We therefore desire to call your attention to the preceding facts and to suggest respectfully that when you fill the present vacancy in the Public Service Commission of Idaho you consider favorably the appointment of one of your engineers."

CANADIAN STANDARD.—The "Inter-Colonial Gas Journal" says: "The new standard to be fixed by the Government for calorific value of the manufactured gas to be supplied in Canada will be not more than 540 B. T. U.'s per cubic foot, and no company will be subject to any penalty unless the calorific value of their gas should fall below 515 B. T. U.'s, or that the average calorific value of the gas supplied by them during any month fall below 525 B. T. U.'s per cubic foot."

EXCLUSIVE CONTRACT NOT ENFORCEABLE.—A lighting contract clause which forbids a party from using any other form of artificial lighting during the term of contract is not enforceable, but does not void the whole contract. This point was brought out in a suit over the contracts of the Washington Water Power Company of Spokane.

WISCONSIN AUTHORIZATIONS.—In order to bring their capitalizations up to the values of their properties, the Wisconsin commission has authorized the West Allis Gas Company to issue $95,000 stock and the Manitowoc Gas Company $65,000 stock.

The Milwaukee Gas Light Company has been authorized to issue $1,500,000 first mortgage twenty-five-year 4% gold bonds to replenish the depreciation reserve, against which expenditures for new construction, extensions and improvements have been charged. The bonds are to be sold for not less than 80.

The Madison Gas and Electric Company has been authorized to issue $650,000 bonds to be sold for not less than 90 to provide funds for extensions and improvements.

The confirmation by the State Senate of the appointment of Mr. Carl D. Jackson, of Oshkosh, as member of the commission to succeed Mr. John H. Roemer has been postponed.

INDIANA LAWS.—Several bills have been introduced in the Legislature amending the Indiana utility law, although Governor Ralston seems to be determined that the present law shall be upheld. Sections of the appropriation bills apply to the Commission and some members will attempt to reduce the salaries of the Commissioners, now paid $6,000 annually. A bill is proposed which would keep members of the Commission from taking part in politics, it being declared that Governor Ralston is backing his close friend and personal appointee, Mr. Thomas Duncan, Chairman of the Commission, for Governor in 1916. Another bill aimes to create a board of finance for the city of Indianapolis which would take over many of the powers of the City Council, and the control of rates and service of Indianapolis public utilities.

UTILITY COMMISSION FOR TEXAS.—Secretary of State Gregg, of Texas, has completed the preliminary draft of the bill to be introduced during the next session of the Legislature to create a Public Utility Commission.

Financial Notes.

THE annual report of the PORTLAND (ME.) GAS LIGHT COMPANY for the past year shows a greater increase than in any year since the company started. The number of consumers December 31st, 1914 was 11,763, as against 11,181 December 31st, 1913, an increase of 582, or 5 1/5%. The gas sold and accounted for during the year amounts to 293,551,000 cubic feet, an increase of 33,586,400 cubic feet, or about 13%. The increase in 1913 over 1912 was 12⅓%. The average consumption per consumer, deducting that of the street lights, was 20,997 cubic feet, as against 20,027 in 1913, an increase of 988 cubic feet per consumer for the year, as compared with an increase of 877 cubic feet per consumer for 1913 over 1912. The average consumption per mile of main is 3,624,000 cubic feet. Gross earnings were $325,486; operating expenses, $239,892; net earnings, $85,596, divided as follows: taxes, $15,470; depreciation, $15,000; dividends, $45,436; balance $9,690, to reserve.

Assets.

Plant investment	$929,023
Distribution investment	620,060
Active assets	69,561
Inventory assets	110,639
	$1,729,283

Liabilities.

Capital stock	$949,100
Funded debt	200,000
Floating debt	140,000
Sinking fund	30,186
Accrued liabilities	34,569
Current liabilities	13,846
Depreciation reserve	169,269
Reconstruction and contingent	192,313
	$1,729,283

THE AMERICAN LIGHT & TRACTION COMPANY, of New York, has declared, in addition to the regular 2½% dividend on the common stock, a stock dividend of 2½%; and the regular 1½% dividend on the preferred stock.

PROVIDENCE, R. I., GAS has risen to 96, its best price since last July. Whether the company will float a new capital issue this year can only be guessed at, but considerable of the recent buying of its shares has been with this contingency in mind. Whenever a new issue—whether stock or short-time debentures—does come, it is likely to come suddenly, since the directors have been authorized to issue new stock at discretion.

THE combined net earnings available for dividends of the subsidiary companies of the MASSACHUSETTS GAS COMPANIES for December were $244,551, a decrease of $24,175, or 9%, compared with the corresponding month last year. The net earnings of the subsidiary companies for the 6 months ended Dec. 31, were $1,296,693, compared with $1,273,727 in the corresponding period of 1913. The December earnings of the several companies compare as follows:

	1914.	1913.	1912.
Boston	$148,755	$139,280	$157,408
N. E. Gas	49,479	68,565	72,488
N. E. Coal	25,458	42,394	17,508
East Boston	4,514	5,393	8,673
Citizens	2,594	289	2,140
Newton & Watertown	1,341	3,152	4,214
Federal Coal	10,647	7,582	9,758
Boston Tow Boat	1,769	2,072	4,700
Total	$244,557	$268,727	$276,889

HENRY L. RICE will be general manager of the WISCONSIN SECURITIES COMPANY, according to the announcement of President Clement C. Smith. The entire capital stock of $1,000,000 has been paid up. The company paid a dividend of $75,000 in 1914, and the surplus at the close of 1914 was $120,000. The following officers were elected: President, Clement C. Smith; vice-presidents, Oliver C. Fuller and William Bigelow; secretary-treasurer, Howard Greene; directors, Charles E. Albright, John L. Beggs, Robert Camp. Patrick Cudahy, J. W. P. Lombard, George P. Miller, Gustave Pabst, Ludington Patton, L. J. Petit, Charles F. Pfister and Fred Vogel, Jr.

THE outstanding stock of the CITIES SERVICE COMPANY of New York has been decreased by $1,200,000 preferred stock and $1,000,000 common stock, owing to the redelivery to the treasurer of the company of stock held to finance the purchase of the stock of the St. Joseph Railway, Light, Heat and Power Company. The balance due is now being put into bills payable, extending over a period of one-half-year.

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